

*The Bench to Bedside Transition - Exceptional Case*

## Renal sympathetic nerve ablation for the treatment of difficult-to-control or refractory hypertension in a haemodialysis patient

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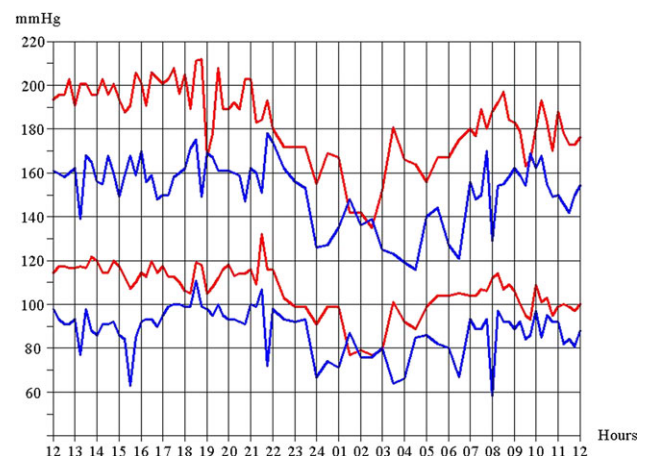
### Abstract

Haemodialysis patients show sympathetic hyperactivity. Hyperactivation of the sympathetic nervous system aggravates hypertension and it is related to left ventricular hypertrophy, heart failure, arrhythmias and atherogenesis. We report the first use of renal sympathetic nerve ablation for correction of uncontrolled hypertension in an end-stage renal disease patient on maintenance dialysis. We observed a progressive and sustained reduction of systemic blood pressure. Our case demonstrates the safety, the feasibility and the efficacy of this procedure. These findings suggest, however, that further clinical trials are needed into renal nerve radiofrequency ablation therapy for the treatment of hypertension and for the improvement of cardiovascular prognosis in this high-risk patient group.

**Keywords:** haemodialysis; renal denervation; resistant hypertension; sympathetic hyperactivity

Haemodialysis patients show sympathetic hyperactivity [1]. Sympathetic activation induces renal vasoconstriction and increased renin secretion with enhanced sodium and water reabsorption. Hyperactivation of the sympathetic nervous system aggravates hypertension and it is related to left ventricular hypertrophy, heart failure, arrhythmias and atherogenesis [2]. The correction of uraemia by renal transplantation did not result in the normalization of sympathetic activity, which was only abolished by bilateral nephrectomy, suggesting that sympathetic activation is driven by the native kidney [1]. Recently, a novel and minimally invasive approach with a catheter-based radiofrequency ablation technology has aroused considerable interest [3]. We report the first use, to our knowledge, of renal sympathetic nerve ablation for correction of uncontrolled hypertension in an end-stage renal disease patient on maintenance dialysis. A 39-year-old patient on chronic haemodialysis underwent the procedure. The cause of renal failure was nephrosclerosis due to long-standing malignant hypertension that was resistant to pharmacological treatment with five different anti-hypertensive drugs. Before

the procedure, the mean office blood pressure was  $180 \pm 15/105 \pm 11$  mmHg, with a heart rate of 72 beats/minute. After access via the femoral artery, a radiofrequency ablation catheter (Symplicity® Catheter; Ardian Inc., Palo Alto, CA) was inserted into each renal artery. Six ablations were performed within each renal artery. We observed a progressive and sustained reduction of systemic blood pressure from  $180 \pm 15/105 \pm 11$  mmHg at baseline to  $155 \pm 14/90 \pm 10$  mmHg at 1 month (Figure 1). The ambulatory blood pressure monitoring showed a decrease in systolic and diastolic average blood pressure variability (from 11.35 to 10.63 mmHg at 1 month). The patient's residual diuresis of 500 mL daily was conserved and the dry weight of the patient was not modified with dialysis. Blood pressure reduction was accompanied by reduced renin and angiotensin-converting enzyme activity (from 13.12 to 11.06 ng/mL/h and from 22.62 to 14.94 IU/L at 1 month). Our case report suggests that renal sympathetic denervation may result in a substantial reduction in blood pressure in haemodialysis patients with refractory hypertension.



**Fig. 1.** Twenty-four-hour ambulatory blood pressure monitoring before and after the procedure. Systolic and diastolic blood pressure 1 month after renal sympathetic denervation.

*Conflict of interest statement.* None declared.

## References

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